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(1.)

HYDATIDS FROM THE LEFT LUNG,

SUBSEQUENTLY TO

THE OCCURRENCE OF TYPHOID FEVER,

COMPLICATED

WITH DOUBLE PNEUMONIA.

by G. Black

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Hydatids from the left Lung, subsequently to the occurrence of Typhoid Fever, complicated with Double Pneumonia.

The extreme rarity of pneumonia being followed by the expectoration of pulmonary hydatids, and the pathological interest necessarily attached to the latter bodies, induce me to present the following interesting case.

H. C., aged forty-five, of nervo-lymphatic temperament, married, mother of ten children, had just completed the sixth month of her eleventh pregnancy, when she was seized, on May 17th, 1852, with typhoid fever complicated with double pneumonia. She had, until this time, enjoyed good health, had always recovered quickly from her confinements, and had for twenty years, weighed from $11\frac{1}{2}$ to 12 stones. She was 5 feet high, well proportioned, and had great capacity of chest.

On visiting her, I found her suffering from extreme shortness of breath, which amounted, by paroxysms occurring at intervals of eight or ten minutes, to a sensation of threatened suffocation, accompanied by an indescribable feeling of syncope. She complained, in broken sentences, of a sensation of weight and of intolerable heat in both scapular, infra-scapular, infra-mammary, and axillary regions; but particulary on the left side. The following notes were taken at the time:—

Thorax.—Breathing short, laboured, and catching; inspirations forty-four per minute; expansion of the lower half of the chest less on the left than on the right side; percussion considerably duller in the left than in the right regions of the thorax already named; duller in the latter than in perfect health; auscultation reveals complete absence of the vesicular murmur in the lower posterior half of the left lung, in which a rough tubular respiration and bronchophony are well marked; in the corresponding portion of the right lung vesicular murmur is diminished in intensity, whilst tubular respiration and

bronchophony are distinctly recognised; cough incessant, short, and dry.

Circulatory system.—Action of the heart abrupt; but sounds perfectly distinct, and free from any exocardial or endocardial murmur; pulsations 125 per minute; radial pulse small, soft, and easily compressed.

Digestive and Urinary systems.—Tongue large, congested with venous blood, covered with a thick, dirty-white, creamy load at the sides, yellowish-brown in the centre; great thirst; no appetite; liver normal; bowels natural; urine scanty and high coloured; no sediment on cooling.

Cerebro-spinal system.—Feeling of constriction over the brow, and of complete languor and prostration; restlessness; some degree of loquacity; occasionally slight incoherence.

Countenance.—Expression of great anxiety; conjunctiva slightly injected; pupils natural; alæ nasi in visible action; lips somewhat blue; face bedewed with a cool perspiration.

General surface.—Temperature of skin slightly increased; diaphoresis commencing.

From the above threatening condition it was evident, that unless the present respiratory capacity could be quickly increased, the patient must shortly perish. With this view, therefore, the circulation through the skin was augmented by additional clothing, extensive counter-irritation to the chest was made by mustard poultices, again and again repeated; whilst a free circulation of cold air through the apartment was obtained by keeping the window and doors open. The hair was cut short, and kept constantly wet with cold vinegar and water, the chest was gently raised, and perfect quietude enjoined. A grain of the chloride of mercury, together with a mixture containing the acetate of ammonia, camphor mixture, and mucilage, was given every two hours; whilst the diet consisted of cold milk and water as a common drink, fowl broth, and raw egg beaten up in common gruel.

On the following day the number of respirations had fallen to thirty-four per minute, and the pulse to 108. The breathing was less laboured; expectoration was being established, and a distinct submucous rhonchus was audible in limited spots

over the affected portion of the left lung. On the right side, where an indistinct vesicular murmur was heard the night before, there was now a complete absence of such murmur, and nothing but rough, tubular breathing and bronchophony could be detected.

The sputum, as yet scanty in quantity, was of a deep rust-colour; and on microscopic examination, exhibited great numbers of blood-discs, epithelial patches, exudation-masses, isolated exudation-cells, and masses of simply coagulated fibrine, together with an increase of mucus-cells, all of which I have elsewhere figured.*

On the third day the chest affection was improving in both lungs; expectoration was fully established, the quantity of sputum expelled amounting to eight ounces by measure in twenty-four hours. It was of the same colour and presented the same structures under the microscope as before named. The respirations were thirty per minute; breathing less laboured.

The fever symptoms, however, had increased. There were increased heat of the head, particularly of the forehead, delirium, dry brown tongue, tenderness of the epigastrium extending to the umbilical region, but no diarrhœa. Pulse 104, small, yet less easily compressed.

On the fifth day the vesicular murmur could be heard in the affected portion of the right lung; but its intensity and duration were, in point of comparison, but half those of the healthy sound. With this return of the vesicular murmur a subcrepitant rhonchus was audible in the minute bronchi and cells; whilst a coarse mucous rhonchus pervaded the whole of the larger tubes. In the posterior half of the left lung the vesicular murmur was still absent; and a coarse mucous rhonchus only was audible over the isolated points above indicated.

The quantity of sputum expelled in twenty-four hours amounted to ten ounces by measure, and its colour and morphological character were similar to those already described.

On the sixth day the symptoms were steadily improving;

* See Papers "On the Pathology of the Bronchio-pulmonary Mucous Membrane," published in the "Monthly Journal of Medical Science" for the current year, by the Author.

the number of respirations had fallen to twenty-eight per minute, the breathing was less laboured, cough less frequent; expectoration easy, and blood beginning to disappear from the sputum; delirium was less urgent; the tongue, for the last three days, dry and brown in the centre, showed a disposition to become moist at the edges; the skin, which for the same length of time had been hot and dry, was now bedewed with gentle perspiration; the epigastrium was less tender, and the pulse had fallen to ninety-eight, becoming, at the same time, larger in its volume and firmer under the finger.

On the morning of the seventh day a measle-like eruption was observed on the trunk, and, for the first time, a deposit of urate of ammonia appeared in the urine. On the ninth day blood disappeared entirely from the sputum.

Having thus established the fact of the existence of typhoid fever and double pneumonia, suffice it to say, that the single application of two leeches to the inside of the nostrils and four to the epigastrium, followed by a blister to the latter region—the continued admission of cold air into the patient's apartment; the steady use of alkalies; mercury, stopping short of its specific effect; camphor, henbane to allay inordinate cough; light, vegetable tonics on the cessation of inflammatory action; repeated blisters to the chest, and a light, nourishing diet throughout, restored the patient to convalescence by July 18th, the case having, during its course, observed many fluctuations.

The lungs, however, and particularly the left one, were not by any means restored to their natural condition. From one inch below the spine of the left scapula downwards, there were distinct and isolated portions of the surface, over which the vesicular murmur could not be heard in the slightest degree, and only rough, distant, bronchial respiration during a forced inspiration; whilst, between such isolated points, a mucous rhonchus was audible during the greater part of the respiratory movement. On the right side the vesicular murmur was audible during easy inspiration; but it was accompanied by a degree of roughness and harshness, and followed by prolonged expiration, all of which showed that the interior of the cells was still irregular from inflammatory exudation, that the walls

of such cells were yet in a thickened condition, and that the free movement of their individual fibres was thereby impeded.

I now, at the request of my patient, who thought herself sufficiently well to dispense with my services, discontinued my attendance. For sometime she still continued to improve; and on the 16th of the following August, she was delivered of a fine, healthy child, and subsequently had a good recovery. On February 23rd, of the present year, I was once more requested to visit her. She now told me, that in October, 1852, her cough and expectoration returned with a "slight cold;" that the former had gradually increased in severity, and the latter in quantity; and that, for four months, she had frequently "coughed up small bladders of water," which invariably burst immediately before passing into the mouth, and filled the latter with a "kind of salt water." She further remarked that, on the expulsion of these "bladders of water," a quantity of blood, varying from a teaspoonful to a wine glassful, together with now and then a quantity of pus, was also expelled by cough; that for some days previously to their expulsion the quantity of sputum was diminished, and the cough more troublesome; and that she could tell, by her sensations, the route by which the hydatids were expelled, which she pointed out as extending from the lower angle of the left scapula, along the inferior margin of the base of the corresponding mamma, to the lower part of the sternum.

Her appearance, at this time, bespoke considerable emaciation. Her countenance was pale and haggard; her eyes were sunk, conjuctivæ pale, and the pupils slightly dilated; the alæ nasi were in visible motion; the teeth seemed to project; the malar bones were prominent, and in the skin over these there occasionally lingered a hectic flush. The skin was generally hot; the pulse 110, small, feeble, and very easily stopped; the tongue was covered with a slight, white fur; more or less thirst, together with loss of appetite, always existed; the bowels were regular; and the urine, natural in quantity, was loaded with lithiates. Profuse perspirations harassed her during the night, whilst her debility, during the day, was so great, that she was frequently unable to leave her bed; and

when she did leave it, she betook herself to a sofa, on which she reclined.

On examining the chest, there appeared to be a little fulness in the lower posterior half of the left side; the mensuration of which side, as compared with the corresponding portion of the right, showed, at the extreme of the ordinary expiratory effort, an increase of $\frac{3}{12}$ths of an inch beyond the latter. On comparing the two sides, however, at the extreme points of forced inspiration and expiration, it was found that the range of action of the lower half of the right side was $\frac{5}{12}$ths of an inch greater than that of the left, thus showing that the tissue of the left lung was constantly kept in a state of medium distension, by a cause foreign to the function of that organ. The upper parts of the chest, on both sides in front, had an equal play, which appeared to be somewhat greater than that which is manifested in the ordinary respiratory movements of the female. Percussion here elicited a clearer sound than in ordinary health; in the posterior part of the right lung, as nearly as possible the sound of health; in the corresponding portion of the left lung, a sound considerably lower than the latter. At a point five inches in the perpendicular direction from the spine of the left scapula, and three inches in the lateral direction from the vertebral spine, distinct cavernous respiration and pectoriloquy were present. From a point two inches below the spine of the left scapula downwards, the respiration, except over the site of the cavern, was absent during the ordinary respiratory movement; but, during forced inspiration, rough, low, bronchial respiration and a mucous rhonchus were heard at several isolated points. Immediately beneath the spine of the left scapula the vesicular murmur was somewhat reduced in intensity, and accompanied by a crackling and crumpling, thereby indicating vesicular emphysema of this portion of the lung. In front, from the supra-clavicular fossa downwards to the nipple, there was augmented vesicular murmur, which was also present in a less degree, in the upper half of the right lung; whilst, in the lower posterior half of this organ, a slight degree of roughness during the respiratory movement, was all that indicated the existence of previous disease in that situation.

The quantity of sputum expelled in twenty-four hours varied, sometimes amounting to two, at other times to four ounces. It presented a dirty-white, or yellowish-green colour, was more or less viscid and tenacious, of irregular consistence, and of the specific gravity of 1·028, at a temperature of 63° Fahr.

Microscopically examined, it was seen to consist of numerous exudation-masses and exudation-cells, plastic and pus-cells, and portions of nerve-tubes and of lymphatic vessels, irregular masses of opaque matter, a few bronchial casts and epithelial patches, together with an ordinary proportion of mucus-corpuscles, as represented at Plate II, Fig. A.

The analysis of this specimen gave the following composition:—

	In 100 parts.
Water	96·93
Organic matter	2·77
Chlorides of Sodium and Potassium Alkaline Sulphates and Phosphates	·27
Sulphate and Phosphate of Lime	·03
	100·00

Such, then, generally, was the microscopic and chemical nature of the sputa at this period. Early in March, both nerve-tubes and lymphatics disappeared from the sputum, and, thenceforward, the case has observed a progressive improvement. On the 13th of May, the day after the last expulsion of hydatids, a careful examination of the chest and of the sputum was again instituted. The only difference in this examination, as compared with the one above detailed, was, with respect to the physical signs of the chest, a diminution in the intensity of the vesicular murmur in the upper portion of the left lung, which murmur was now less distinctly heard than the healthy respiratory sound. The extent of the cavern in the lower lobe of this lung, as ascertained by admeasurement on the 15th of March, and again on the 13th of May, was $2\frac{1}{2}$ inches in the perpendicular, by 2 inches in the transverse direction. At the latter date the number of respirations was 20 per minute, the breathing was only sensibly hurried on exertion, and the cough was much less troublesome than formerly. The pulse was 86, small and somewhat feeble; the tongue moist and covered

with a slight, white fur; there was little or no thirst; the bowels were regular; and the appetite, deficient in the morning, was reported to be very good in the latter part of the day.

The quantity of sputum expelled in twenty-four hours amounted to two ounces by measure; its colour being yellowish-white; and, on the 13th of May, it had the specific gravity of 1·026. Microscopically examined, at this period, it exhibited great numbers of pus-cells, varying in size from $\frac{1}{2200}$th to $\frac{1}{4000}$th of an inch in diameter; plastic-cells of similar growth; exudation-masses and exudation-cells, large, well-developed mucus-corpuscles, and here and there a basement patch. Immediately, however, before the expulsion of the hydatids, a few bronchial casts were, in addition to the above structures, present in the sputum.

Fig. B, Plate II, represents the microscopic character of the sputum at the date above-mentioned.

A careful analysis gave the following composition :—

	In 100 parts.
Water	97·29
Organic Matter	2·29
Chlorides of Sodium and Potassium	·36
Alkaline Sulphates and Phosphates	
Lime (~~mixed~~ as Chloride)	·06
	100·00

On comparing the above analysis with the previous one, it will be seen, that the sputum of the 13th of May, contained less organic matter and more salts than that of the 23rd of February. The reason of this is discoverable in the microscopy of the sputa at these periods, which shows that, in the sputum of the 23rd of February, a considerable portion of the organic matter was due to the presence of portions of the different structures composing the pulmonary tissue; whilst that of the 13th of May consisted almost entirely of structures in the process of growth, the required conditions of which involve the necessity for the presence of the alkaline salts of the blood in greater proportion than is observed in structures which have already completed their development. Now as, in the sputum of the 13th of May, cell-growth was in excess of that observed

in the sputum of the 23rd of February, the excess of salts in the former, as compared with the latter, is but the further confirmation of a law which obtains with respect to inflammatory exudations in the lungs, and which I have elsewhere developed.*

In passing to the special consideration and examination of the hydatids discharged, it may be remarked, that in the early part of their history, their expulsion took place at intervals of from two to five days; that, since the beginning of April, an interval from two to three weeks has elapsed; that their expulsion is preceded by a violent fit of coughing, a single paroxysm of which was formerly sufficient to effect the dislodgment, but which now requires to be again and again repeated, and not unfrequently extends over a period of several days; that, whenever one of the largest size has to be expelled, the breathing, during its transit through the windpipe and glottis, is greatly obstructed; so much so, indeed, that a momentary sensation of impending suffocation is excited; that, apparently at the moment of its passing the glottis, it bursts and fills the mouth with a fluid, which is described by the patient as being extremely salt to the taste.

Examined by the naked eye, the bodies in question represent semi-transparent, white, yellowish, or bluish-white, collapsed sacs, which vary in size from a small pea to a pigeon's egg. One, however, which was expelled on the 12th of May, and which is now in the possession of this Society, is equal in size to a hen's egg. The walls of these sacs are irregular as to their thickness; rough and flocculent on their outer surface; smooth within; consisting, in some, of several layers, and presenting an angular aperture at the seat of rupture.

Microscopically examined, they are seen, in point of structure, to approach, as nearly as possible, to that of a mucous membrane, and consequently to consist of an external fibrous tissue, within which rests a basement structure, surmounted by an imperfectly developed epithelium.

A fibrous tissue, however, cannot be detected in every spe-

* "Monthly Journal of Medical Science," 1852.

cimen examined; but when present, which is very frequently the case, it is seen in bands, and isolated, slightly-branching, fibrillæ. The former are generally from $\frac{1}{1000}$th to $\frac{1}{3000}$th of an inch in breadth, and are composed of fibrillæ varying from $\frac{1}{12,000}$th to $\frac{1}{18,000}$th of an inch in diameter, which run side by side, sometimes in a slightly wavy direction, without branching or altering their relative distance to each other. The latter, on the contrary, pursue an isolated course, are about $\frac{1}{8000}$th of an inch in diameter, slightly tubular, present nuclear enlargements at irregular distances, and give off, here and there, a single branch. These fibres correspond in structure to the yellow fibrous tissue; whilst the others are similar to those constituting the white fibrous tissue. As a general rule, neither blood-vessels, lymphatics, nor nerves form a part of this layer of the hydatid; nevertheless, I have twice seen, in specimens the most organised, a few isolated capillaries present.

The layer within this, which corresponds to the basement structure of mucous membrane, is not so uniformly set with nuclear points as the latter; consequently the epithelium does not observe such regularity and uniformity of extension as the epithelium of mucous membrane. It, on the contrary, exists in patches, which leave intervals occupied by irregularly developed cells and minute, opaque, and semi-transparent bodies, most of which show a disposition to cell development. Some of these cells are non-nucleated; others present one, and sometimes several nuclei. Hence the former correspond with the exudation-cell, and the latter with the plastic-cell. Acetic acid and liquor potassæ render them more transparent. By prolonged contact with the latter they are ultimately destroyed.

To ascertain chemically the proximate constituents of these bodies, five of medium size were boiled for two hours in distilled water, in a porcelain capsule, over a spirit lamp, after which the fluid was evaporated to a drachm by measure, and then set aside to cool. After having cooled to the temperature of the surrounding air no jelly-like consistence of the fluid was observed. On adding three drops of the tincture of galls to one half of it, no palpable precipitate was produced; whilst the same quantity of the tincture, added to a solution of one grain

of gelatine in half a drachm of water, threw down a copious precipitate. On evaporating the other half drachm of water in which the hydatids had been boiled, a small quantity of white, or brownish-white solid residue remained, which, however, was too small to afford satisfactory evidence, by the usual chemical re-agents, of its protein character.

The hydatids were next boiled for half an hour in alcohol, which was then set aside to cool. On cooling, no trace of fat was observed on the surface; and on evaporating the alcohol, but a slight trace of extractive matter remained. During the immersion of the hydatids in the boiling alcohol their bulk was reduced to one-third.

The hydatids in question were now thrown into 4 drachms of pure acetic acid, in which they immediately began to swell, and to become more transparent. After having boiled in this fluid for half an hour, they were removed, and the fluid was slowly evaporated. When half this fluid had been dispersed the remainder became milky, and immediately afterwards, under the continuance of heat, a thin pellicle, which subsequently broke into small flocculi, appeared on the surface of the acid. On exhausting the acid by evaporation, a white powder, weighing a little less than half a grain, was left, which redissolved in boiling acetic acid, exactly in the same manner as the coagulated albumen of the egg under similar circumstances.

The remaining portions of the hydatids were next subjected to the action of liquor potassæ, which, aided by heat, effected their complete disintegration, and acquired the colour of a rather strong solution of burnt sugar, thus demonstrating the characteristic action of the solvent on fibrine. The presence of the protein compounds was further shown by the addition of strong nitric acid to a fresh hydatid, which became yellow at the point of contact from the formation of the xanthoproteic acid.

Several hydatids were incinerated, and the ashes thus left, were digested in warm distilled water for a short time, after which nitrate of silver and chloride of barium were added to separate portions of the fluid. These, by the precipitates

thrown down, indicated the presence of chlorides and sulphates; whilst the presence of lime was demonstrated by adding to the insoluble residue of the ashes in water, first a drop of hydrochloric acid, afterwards the same quantity of a solution of oxalate of ammonia, immediately after which a copious precipitate of oxalate of lime was produced.

Thus, then, the chemistry of the walls of the hydatids showed that their proximate constituents consisted essentially of the protein-compounds in combination with the different salts which are necessary for their development into cells or tissual formations; whilst their microscopical examination as clearly indicated that such constituents had already acquired a considerable amount of organization.

On subjecting to the microscope the fluid of a small hydatid which had not burst during its expulsion, great numbers of exudation-masses and isolated exudation-cells were observed. The former were undergoing development into cells—the latter were well formed, and were of all sizes, as we see in the sputum of bronchitis. Besides these structures, there were also a few plastic, but no pus-cells—a few basement patches, and irregular black nodules and masses of the sulphate and phosphate of lime.

In this fluid the nitrate of silver detected the presence of chlorides—the chloride of barium, that of sulphates—and the oxalate of ammonia, preceded by the addition of hydrochloric acid, a strong impregnation with lime.

In commenting upon this case, the various points which, at this period, require special notice, resolve themselves into the following propositions:—

1. The pathology and nature of the hydatids discharged.
2. Their import as influencing the prognosis.
3. The treatment which they, in conjunction with the physical signs, indicate.

With respect to the first proposition, it is clear, from the physical signs of excavation in the lower lobe of the left lung, from the presence, at one time, of nerve-tubes, lymphatics, and other bodies of the sputa, as confirmatory of an ulcerative action in the pulmonary tissues,—and from the microscopical

and chemical nature of the hydatids expelled, as compared with the exudation of bronchitis,—that the hydatids in question have their origin in exudation-plasma, which is thrown out upon that surface of the excavated portions of pulmonary tissue which may be said to form the walls of each individual cavern. It there coagulates and forms a perfect lining for each excavation; and having thus obtained a *locus standi* and the necessary conditions for germination and growth, it undergoes those morphological changes of which it is capable from its own inherent vitality, modified by the tissues on which it is placed. Hence the formation of fibrillæ, exudation-cells, plastic-cells, and an imperfect epithelium. This imperfection of the epithelium, in reference to continuity of extension, has, as a necessary condition, portions of the basement-structure of the hydatid perfectly bare, on which the fluid exudation, which permeates the walls of the hydatid, coagulates and subsequently passes into cell-development. In this way only can we account for the presence of organic bodies within the sac of the hydatid. The existence of such structures in the fluid of the hydatid, and the chemical nature of the contents of the latter body, correspond, in these particulars, to the bodies found in the exudation of bronchitis and to the chemical nature of such sputa; whilst the absence of pus-cells from the fluid of the hydatid is readily explained by the non-vascular condition of the walls of the sac, and, therefore, by the want of that supply of oxygen to the structures contained within the hydatid, which is necessary for the degeneration of the plastic into the pus-cell. Still it is very possible that, with a non-vascular condition of a hydatid, the contained plastic-cells might degenerate into the pus-type; but this possibility seems to imply the necessity for a direct communication with the air taken into the lungs. This condition only occasionally existed in the above case; and its occurrence invariably took place on the expulsion of one or more large hydatids, and for several days afterwards, during which time only cavernous respiration and pectoriloquy were well marked. About the fourth day after the expulsion of hydatids the physical signs of pulmonary excavation became more obscure, and this obscurity in-

creased until the physical signs indicated, in a very indistinct manner, the existence of such excavation, with here and there the sounds indicative of a patent bronchus stretching partly through the consolidated mass.

From these facts, and from the presence of bronchial casts in the sputum immediately before the expulsion of hydatids, it seems very probable that, during the formation of the latter bodies, the bronchi leading to the seat of excavations were temporarily obstructed, by inflammatory exudation, at the point of communication with the caverns, and that by this means, a direct communication between the external air and the hydatids was prevented. Hence, then, the reason why the organic structures within the sac of the hydatids could not pass into the pus-type.

It has been before remarked, that the walls of some of the hydatids were of irregular thickness, and that they consisted of layers placed one within another. In explanation of this fact, it is easy to conceive, that, after a single layer of exudation, plasma has undergone partial organization, and has thus formed a lining for the excavations ; its connection with the surface on which it is formed, may be disturbed by cough, and may thus admit of a further layer of exudation subjacent to it, which, in its turn, may undergo partial organization, and subsequent disturbance by cough or other causes, thus continuing the formation of layers to the third or fourth series. The partial separation, however, may not take place to the full extent of surface involved in the formation of the hydatid ; and, in this case, a second exudation will be limited to those points of the surface between which and the corresponding points of the hydatid the connexion has been disturbed. Hence, then, the reason of the frequent irregularity of thickness in the walls of the hydatids.

In reference to the second proposition, *i. e.*, the influence which these bodies ought to have on our prognosis, I conceive that, as their organization demonstrates a strong disposition in the exudation-plasma to assume a permanently structural form, it is very possible that an undisturbed connection between the hydatids and the surfaces on which they are formed, may take place, and that a limit may thereby be given to the further

destruction of pulmonary tissue. Their formation, therefore, is, in my opinion, to be regarded as favourable to prognosis; but whether the favourable termination which they seem to indicate, shall or shall not be realized, will depend on the degree and extent of disease in the surrounding portions of lung, on the activity or inactivity of such disease, on the amount of reduction in the respiratory function, and its consequent effect upon the constitutional powers, and on the influence of external causes. In the above case it has been shown, that there remains considerable consolidation of the lower lobe of the left lung; that the greater portion, however, of the exudation is in a quiescent state; that the increased action of the right lung compensates, in a great measure, for the deficient action of the lower diseased lobe of the left; that the respiratory function has, in consequence, approached more nearly the standard of perfect health, and that the nutrition of the body is observing a proportionate ratio. A hope may, therefore, be entertained that the patient will recover. Should such be the case, what are the pathological changes that are likely to attend such a result? Will the hydatids last formed, remain as such, maintaining their *status quo* in every respect? Will they, on the contrary, become further organized, receive blood-vessels, be subject to molecular nutrition and decay, as are all living structures, and ultimately effect their own obliteration by the absorption of their fluid contents, and the gradual approximation and adhesion of their opposite surfaces? Or will a communication be established between their sacs and the bronchi, in the direction of which they lie, the inner surface of the hydatid at the same time taking on the function of a modified mucous membrane?

That, on the supposition of recovery, the hydatids will maintain their condition as such, is opposed to their present degree of structural development, which plainly indicates that the ultima linea of their organization is a close approximation to that of a mucous membrane.

That, on the same supposition, they will undergo a further degree of organization is certain; and this further organization will place them in the category of vascular structures (a result

already indicated by the occasional presence of a capillary blood-vessel in the outer or fibrous coat of the hydatid) under which condition they will, like all other living structures, be subject to the ultimate molecular action in the process of nutrition and decay. This action would consequently imply the capability of absorption, and the power of deposition; therefore occlusion of the hydatids may occur by

1. The shedding of their scattered epithelium.
2. The exudation of blood-plasma upon the whole of the basement structure of the hydatids thus laid bare.
3. The subsequent absorption of the fluid contents of the hydatids and the organization of the coagulated portion of the exudation, by which the opposite surfaces of their sacs will become united.

Again, it is very possible that, instead of the shedding of the scattered epithelium of the hydatid as just mentioned, this structure might become perfect, and thus form one continuous lining to the hydatid, owing to the acquirement, by the whole basement structure, of the necessary conditions for epithelial growth. In this case it is probable that the hydatid would exist as a permanent sac, which, having served the purpose of its formation, would manifest no ulterior object in the organism.

But the presence of an epithelium points to another result as the probably legitimate termination of such a case. It shows that the structure of which it forms a part, is destined to maintain an independent existence amongst the living tissues; therefore, on the supposition of recovery, it is probable that a permanent communication will be established between the sac of each hydatid and an adjacent bronchus by the expulsion of the obstructing cast of the latter, and the mechanical rupture of the contiguous wall of the former; that the lining of the hydatid will thenceforth assume the function of an adventitious mucous membrane, and that the pulmonary excavations will ultimately represent so many saccular dilatations of the bronchi.

Adopting then the view, that the formation of pulmonary hydatids is favourable to ultimate recovery, the indications of treatment have for their object—

1. To maintain the connection between the hydatids and the surfaces on which they are formed, in order that they may become vascular, and, to a certain extent, independent structures.
2. To maintain the *status quo* of the exudation which has been poured into the pulmonary tissues around the excavations, and to heal bronchial ulceration in the few tubes which are yet patent in the lower lobe of the left lung.

Now, the first indication will be fulfilled by maintaining a brisk circulation through the skin, and thereby guarding against pulmonary congestion, by allaying cough, which would disturb the connection between the hydatids and their parent surfaces, and by restoring the vital tonicity of the capillaries from which the exudation, necessary for the formation of hydatids, takes place. Hence the necessity for the use of warm clothing, the occasional exhibition of anodynes and sedatives, the observance of quietude of the voice, of a light, nutritious, but unstimulating diet, and of the steady perseverance in mild tonics, together with the maintenance of slight counter-irritation over the seat of disease.

To fulfil the second indication it will, in addition to the means already specified, be necessary to maintain a uniformity of temperature of the air breathed, which should be cool rather than otherwise, in order that the vital tonicity of the capillaries of the affected bronchi may be gradually excited to a healthier degree of action, by which the pathological condition of the vessels, necessary to the occurrence of further exudation, would be destroyed.

Here, I conceive, that the use of the alkalies, which have elsewhere been shown to exert such beneficial influence in the removal of inflammatory exudation, is powerfully contra-indicated; inasmuch as they, by the chemical action which they would exert upon such exudation, would not only tend to destroy the connection between the hydatids and their parent-surfaces, but also to excite the latent tendency to germination in the exudation surrounding and constituting the walls of the pulmonary excavations, and thereby to favour the extension of the latter. This objection, however, to the use of alkalies will

only hold good until the hydatids shall have acquired the condition of vascular structures, after which their exhibition will favour the disintegration of that portion of exudation, the quiescent state of which it is one object of the present treatment to preserve.

Having conducted the above case according to the views and principles here enunciated, I have the satisfaction of being able to state that a great improvement has already occurred; that this improvement is manifested by a less frequent expulsion of hydatids; a total cessation of all febrile movement, diminished cough, and expectoration; a diminution in the frequency of the respirations and of the pulse; an enlarged respiratory function, and a considerable addition to the weight of the body. In this last-mentioned respect, the difference between the weight of the body at the time of its greatest reduction and the present moment (May 19th), amounts to an increase of twenty-three pounds.

Such, indeed, is the manifest improvement which the patient has undergone, and so sensible is she herself of it, that she not unfrequently disregards advice by taking an active part in the management of her household duties.

Dr. Quain, for Dr. Black, *of Chesterfield*,
19*th of May*, 1853.

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DESCRIPTION OF PLATE.

FIGS. A and B illustrate Dr. C. Black's case of hydatids from the left lung, subsequently to the occurrence of typhoid fever, complicated with double pneumonia. Page 44.

FIG. A.

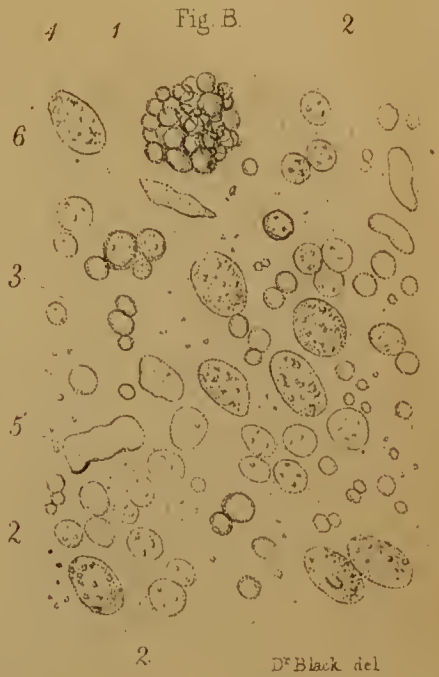
1. Epithelial patches.
2. Mucus corpuscles.
3. Exudation cells.
4. Plastic cells.
5. Pus cells.
6. Exudation mass, showing traces of cell-development.
7. Portion of lymphatic vessel.
8. Portion of a nerve-tube.
9. Bronchial cast.

FIG. B.

1. Exudation mass in the process of cell-development.
2. Pus cells.
3. Exudation cells.
4. Mucus corpuscles.
5. Basement patch.
6. Plastic cells.

Fig. A.

Fig. B.



Dr Black del

Fig. C.

Fig. E

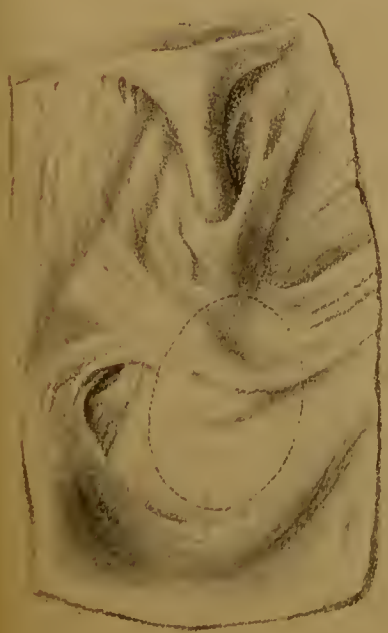
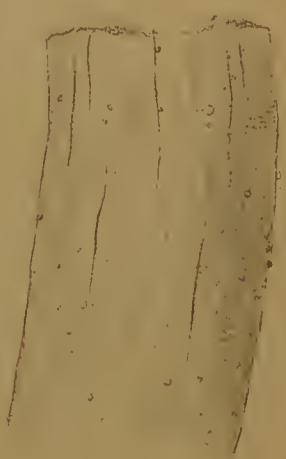


Fig. D.

Fig. F.



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